



Watershed Health Assessment Tools Investigating Fisheries

The ORD/NERL Canaan Valley Institute (CVI) Aquatic Ecosystem Team has completed the initial development of a Windows-based toolkit for analyzing and directing fisheries management and habitat restoration in the Mid-Atlantic Highlands (MAH). This software toolkit, CVI-WHAT IF (Watershed Health Assessment Tools Investigating Fisheries), and associated online watershed calculators are now available on CVI's web site (www.canaanvi.org). Users interact with the software interface to frame the problem by: (1) selecting valued endpoints of concern; (2) accessing data and models to establish the causal relationships between stream habitat characteristics and changes in endpoint status/trend; and (3) performing multiple model executions and visualizations of projected outcomes so that management can evaluate associated costs and benefits.

Training courses for the software have been given in Athens, Georgia for EPA Regional and State managers and in a CVI-hosted "Fisheries Management and Watershed Restoration" Workshop in December 2004 attended by over 25 state, federal and nonprofit clients from the Mid-Atlantic Highlands region.

Significance for Agency Decision Making

Stream ecosystems are common and widespread habitats in landscapes that can support high diversity and productivity of aquatic organisms. As watersheds are utilized for agriculture and undergo urbanization, water courses accumulate pollution and aquatic organisms can be negatively affected. Fish are often used as monitoring and assessment endpoints in streams by the EPA and other government agencies; they are easily measured and their overall health is determined by an integration of multiple watershed stressors. The primary stressors in most watersheds are nonpoint source pollution, altered hydrologic regimes, sedimentation and habitat degradation. Over half of the streams in the Mid-Atlantic Highlands have fish communities that are in fair or poor condition, and the EPA concluded that physical habitat alteration represents the greatest potential stressor in this region (USEPA, 2000).

Management for these ecosystems involves the assessment of probable causes of impairment and management alternatives, as well as the forecasting of future conditions in a scientifically defensible fashion to more effectively protect and restore valued ecosystems. Communities, watershed groups and states require decision support tools for managing the quality of aquatic systems. Community-based environmental management is a long-term goal of the Agency, and providing the methods, tools and technical transfer required to achieve this goal are critical roles of ORD. Effective client collaborations are the most efficient means to achieve this. Although there are many ecological endpoints that are important indicators of the condition of aquatic communities and their associated watersheds, fish health is arguably one of the most important since fishability is a principal designated use for surface waters under the Clean Water Act.

CVI is dedicated to addressing the environmental problems in the MAH. Their goal is to develop and implement solutions to restore damaged areas and protect aquatic systems. To achieve this goal CVI has produced its Highlands Action Program (HAP) which details the need for a prioritization toolkit that combines economic, social, political and economic tools for environmental stewardship. Productive, sustainable fisheries, i.e., trophy trout streams, are valued aquatic endpoints. Planned restoration activities in the region include riparian zone restoration and stream channel design to mitigate near stream inputs and stabilize stream banks. WHAT IF has been designed as a comprehensive regional biological assessment and management tool for application with other components of the HAP.

Implementation of regional watershed protection in the Mid-Atlantic Highlands is achieved through the partnership with CVI (offices in West Virginia, Maryland and Pennsylvania) and their partners in watershed improvement and riparian restoration, such as the US Fish and Wildlife Service. CVI's mission in the region includes support for a wide range of interest groups, local and state governments and nonprofit organizations. The Institute distills the combined needs of a diverse group of stakeholders. Outcomes involve allocation of state and local funds to restoration activities and fisheries management programs in streams and rivers that meet ecological, socioeconomic and political criteria. The EPA team has collaborated with CVI since the project's initial stages, when CVI delegates participated over several days in presentations and discussions at a formal peer review. The CVI Team collaboration with its partners and clients has been very successful in the Mid-Atlantic region due to the essential role provided by the partners, translating regional environmental needs into product specifications as well as translating EPA products back to its constituents.

Current Applications

Regional projects require working across state boundaries and should include all interested parties; the CVI Team has done this with the CVI-WHAT IF Toolkit. The team has delivered a variety of products to meet client and stakeholder needs in the Mid-Atlantic Highlands: a color brochure describing habitat suitability for a regional indicator, the longnose dace; web-based calculators for regional habitat suitability index and fish assemblage investigations; and the desktop CVI-WHAT IF application that installs the combined toolkit as well as the supporting regional database. The CVI Team has also produced a suite of peer-reviewed articles and technical reports. Feedback from all Mid-Atlantic Highlands States and multiple nonprofit organizations (e.g., Trout Unlimited, Partners for Wildlife) on these products and associated training workshops have led to updates on the original toolkit in order to incorporate aspects of state regulatory and monitoring needs. The result is that the toolkit provides a uniquely consistent regional approach.

The Canaan Valley Institute and the States of Virginia and Florida have requested additional training workshops of the CVI Team. Collaboration is underway with the USEPA's National Health and Environmental Effects Research Laboratory for extending the CVI-WHAT IF Toolkit to estuaries and coastal environments. The CVI environmental decision support tools have caught the attention of others with a watershed protection mission in the Mid-Atlantic, including the Region III Environmental Information and Analysis Division, the Mid-Atlantic Integrated Assessment (MAIA) Program of ORD, and the US Fish and Wildlife Service. EPA Region III is committed to the ORD/Mid-Atlantic Integrated Assessment (MAIA) program to partner with states towards adoption of the CVI WHAT IF Toolkit for stream management in the Highlands, developing statewide restoration strategies. The EPA National Risk Management Research Laboratory (NRMRL) Re-PLUS (Restoration Plus) program is collecting data on best management practice (BMP) efficiency, and the CVI toolkit provides a means of organizing information so that it can be assimilated, made available, and immediately used for management and decision analysis.

For Further Information Contact:

John M. Johnston, Ecologist,
Ecosystems Research Division/NERL (706) 355-8153
johnm.johnston@epa.gov

References

Rashleigh, B., M.C. Barber, M.J. Cyterski, J.M. Johnston, R. Parmar, and Y. Mohamoud. 2004. Population Models for Stream Fish Response to Habitat and Hydrologic Alteration: The CVI Watershed Tool. U.S. Environmental Protection Agency, Athens, GA. EPA/600/R-04/190.